March 18, 1941. S. V. LAUB 2,235,436

MEDICAL APPLIANCE

Filed Nov. 3, 1939 2 Sheets-Sheet 1

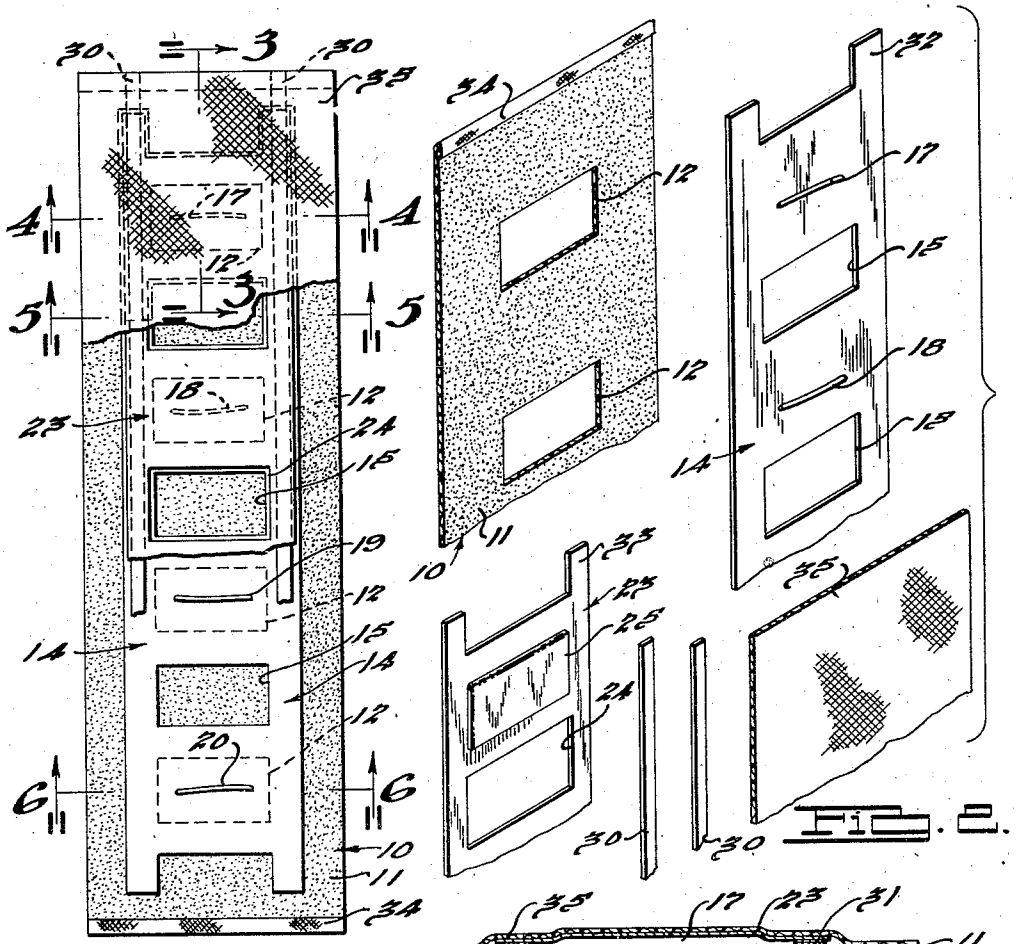


FIG. 1.

FIG. 2.

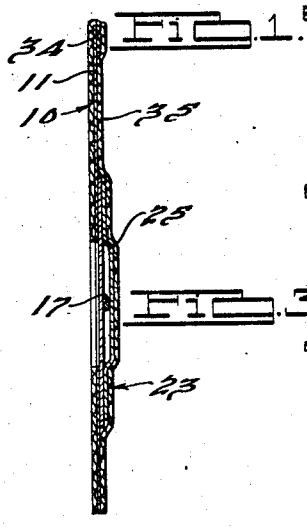


FIG. 3.

FIG. 4.

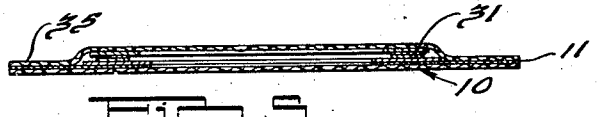


FIG. 5.

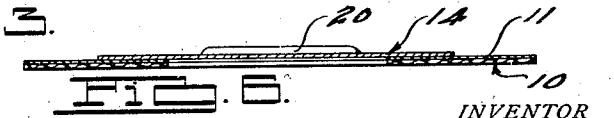


FIG. 6.

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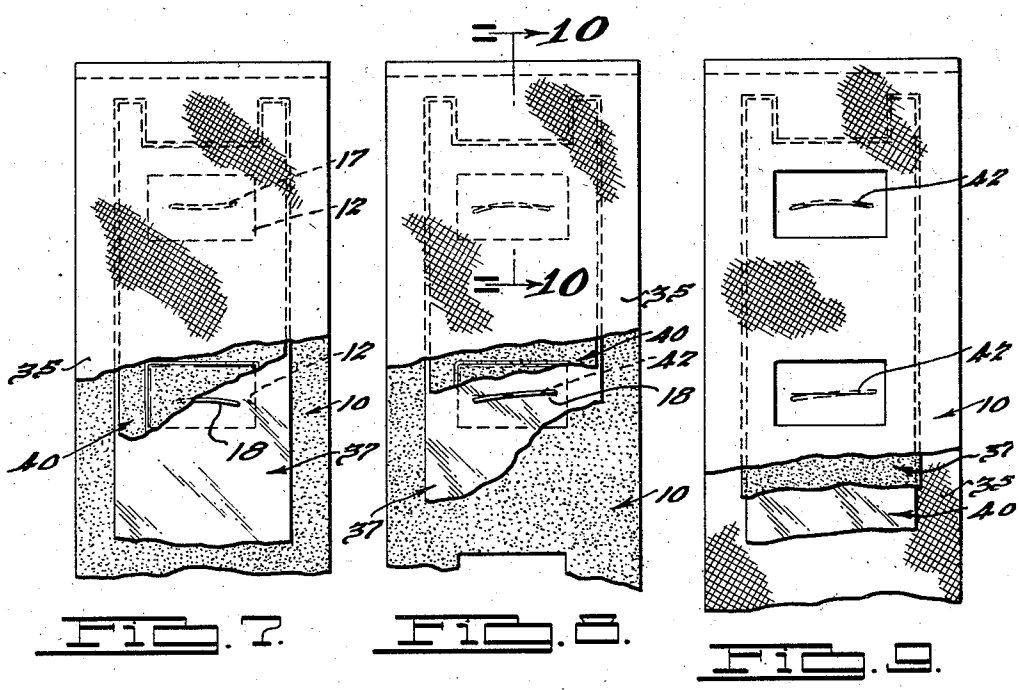


Fig. 7. Fig. 8. Fig. 9.

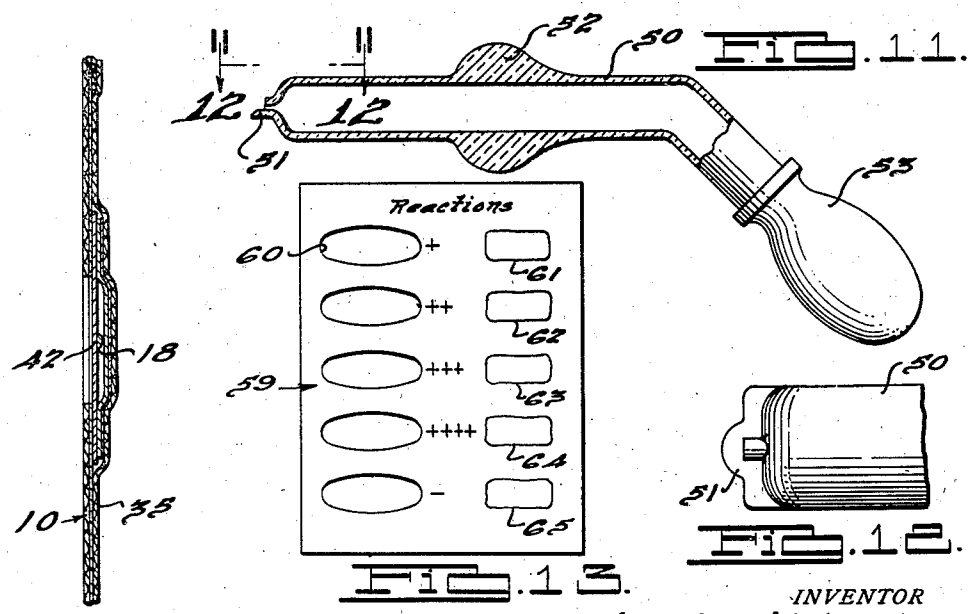


Fig. 11. Fig. 12. Fig. 13.

Fig. 10.

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MEDICAL APPLIANCE

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Application November 3, 1939, Serial No. 302,637

8 Claims. (Cl. 128—2)

This invention relates generally to the field of medical appliances and it has particular relation to appliances on the order of bandages which may be applied to skin surfaces.

While the invention may have different applications, it particularly concerns the conducting of allergenic tests for the purpose of determining the sensitivity of patients to different allergens. For example, a patient suffering with hay fever may be given an allergenic test to determine his sensitivity to different plant pollens. Such allergenic tests are conducted normally by applying each of the allergens to a scratched surface on the skin and it follows from this that numerous areas of skin surface must be scratched if the test is to be at all comprehensive. The conduction of allergenic tests in this manner has many disadvantages. In the first place, a great amount of time is required on the part of the physician to apply the allergens in separated areas and moreover the work is extremely tedious, especially if a large number of allergens are applied. With the present method of application of allergens, especially when the powdered type of allergen is used, great care is required to prevent one powdered allergen from being blown from one area of the skin to another and, since an extremely small amount of the allergen will produce a reaction on an abraded skin surface, it becomes easily understandable how one allergen may contaminate another area of the skin to which a distinctly different allergen is to be applied without the investigator being aware of the contamination and thus produce a false or misleading result. Unless one is skilled in the procedure, it is difficult to properly space the different allergens on the skin surface in an efficient manner so as to prevent one reaction from encroaching on another, in the case of positive reactions, and still permit of a conservation of the available skin surface when a great many tests are required. Again, if the investigator contemplated the use of a series of patch, instead of scratch, tests, a great deal of time would have to be consumed in removing the individual allergen bandages in order to determine the reactions of each on the specific skin area. Unless these individual areas were carefully marked beforehand one can readily see how extreme confusion might evolve from such a procedure.

From the patient's point of view, it is not pleasant to have a large number of allergens applied to different skin areas especially where repeated scratching or repeated application of separate bandages is required, as with the patch test method. Again, it is not so pleasant from the patient's point of view to have these bandages partly removed for each observation of the skin reaction as the pulling of adhesive from the skin surface certainly involves discomfort. Such disadvantages are very much more pronounced in the event the patients are infants or children.

While other disadvantages may characterize the procedure, at least the foregoing contribute considerably to discouragement of allergenic testing. In most instances perhaps the family physician does not want to personally make the tests owing to the time and tedious efforts required, while on the other hand the average family will find it difficult, if not impossible, to have proper allergenic tests made by specialists in this field due to the cost involved. When it is considered that allergenic testing is of great importance not only for the purpose of determining the particular types of pollens involved in a case of hay fever but also for determining the patient's sensitivity to foods and other agents to which humans are subjected, any improvement which will enable and encourage a greater number of people to have such tests made necessarily becomes highly desirable.

One object of the present invention is to provide improvements in allergenic testing which will allow such tests to be made without requiring much time or effort on the part of the physician, to the end that endeavors on his part, as well as the patient's, in this direction will be encouraged.

Another object of the invention is to provide a medical appliance in the form of a bandage which includes different allergens properly located and maintained in good condition until used, and which may be applied to the skin without requiring much time or effort on the part of the physician.

Another object of the invention is to provide an allergenic testing appliance in the form of a bandage which is of such character that the skin reaction to different allergens may be observed from time to time without removing the bandage from the skin, and accordingly which may be retained on the skin until the test is completed.

Another object of the invention is to provide an allergenic testing bandage ready for application to the skin wherein the allergen is preserved in good condition until used, by means of a closed container substantially impervious to air and moisture and forming a part of the bandage.

Another object of the invention is to provide

an improved allergenic testing appliance such as mentioned wherein the allergen is covered by a layer of such impervious material that when it is applied to the skin area, maceration of the skin area will occur due to the fact that the accumulation of perspiration from the skin will be sealed from the outside air, the perspiration thus acting as a macerating agent to the top layer of the skin and thereby permitting of reaction of the allergen at the desired anatomic layer of the true skin.

Another object of the invention in general is to provide an allergenic testing appliance which includes an allergen combined with an abrasive material to the end that massaging of the allergen and abrasive material simultaneously on the skin will cause the desired abrasion of the skin, thus permitting direct action of the allergen on the abraded area without having to resort to the more usual scratch method and also without necessitating the massaging implement coming into immediate contact with either the allergen, abrasive material, or the skin.

Another object of the invention is to provide an instrument for manually securing an abrasion of the skin and simultaneously applying a solution to be mixed with the allergen that is to be applied to the skin.

Another object of the invention is to provide an identifying chart for facilitating reading of the reactions by an investigator who may not be particularly skilled in the interpretation of the skin reactions when positive reactions occur or when a negative result is obtained.

Another object of the invention is to provide an allergenic testing appliance having a transparent material which permits of reading of the reactions without the necessity of removing the testing appliance to do so.

Other objects of the invention will become apparent from the following description, from the drawings to which it relates, and from the claims hereinafter set forth.

For a better understanding of the invention reference may be had to the drawings wherein:

Figure 1 is a plan view of an allergenic testing appliance constructed according to one form of the invention, with certain parts broken away for the purpose of showing interior structure;

Fig. 2 is an exploded view showing the parts embodied in Fig. 1 prior to assembly;

Fig. 3 is a cross-sectional view on a larger scale taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view on a larger scale taken substantially along the line 4—4 of Fig. 1;

Fig. 5 is a similar cross-sectional view taken substantially along the line 5—5 of Fig. 1;

Fig. 6 is a similar cross-sectional view taken substantially along the line 6—6 of Fig. 1;

Fig. 7 is a view on the order of Fig. 1, illustrating another form of the invention;

Fig. 8 is a view similar to Fig. 7, illustrating still another form of the invention;

Fig. 9 is a view similar to Fig. 8, but illustrating the opposite side of the appliance shown by the latter figure;

Fig. 10 is a cross-sectional view on a larger scale taken substantially along the line 10—10 of Fig. 8;

Fig. 11 is a cross-sectional view of an instrument having particular utility in connection with the appliance shown by Figs. 8, 9, and 10;

Fig. 12 is a view on a larger scale taken substantially along the line 12—12 of Fig. 11;

Fig. 13 illustrates an identifying chart to be used for facilitating reading of reactions.

Referring to Figs. 1 to 6, inclusive, the appliance illustrated embodies a strip of adhesive tape 10 having an adhesive 11 thereon and such tape, as best shown by Fig. 2, has openings or windows 12 located in linearly spaced relation. Over the adhesive side of the tape, a thin and flexible strip or layer 14 of transparent Cellophane or other suitable cellulose derivative is applied so that the Cellophane is held on the tape by the adhesive. The strip 14 also is provided with openings 15 disposed in linearly spaced relation and the purpose of these openings is to expose the adhesive in areas intermediate the openings 12 in the tape. As will be seen in Fig. 1, the Cellophane 14 covers the opening 12 in the adhesive tape and when the construction is viewed from the opposite side of the tape, the latter appears to have linearly spaced windows covered by transparent Cellophane. It will be observed that a substantial margin of adhesive is exposed along the sides and ends of the Cellophane 14 and it may be mentioned in this connection that this exposed adhesive, as well as the exposed adhesive seen through the openings 15, serves to attach the appliance to the skin of a patient.

Between the openings 15 and between each of the end openings and the end of the Cellophane strip, allergens 17, 18, 19, and 20 are attached to the Cellophane and this may be accomplished by mixing the allergen with a tacky or gummy substance, such as gelatin, which will cause it to adhere to the Cellophane when pressed thereagainst.

Additionally, it may be preferable to mix an abrasive, such as pumice or one of the silicates, with the gummy allergen in order to provide a means for securing an abrasion of the skin if the material is rubbed against the latter.

With the Cellophane strip 14 applied to the adhesive, as shown by Fig. 1, and with the allergens in place in the areas over the windows 12 in the adhesive tape, a second and similar strip of material 23 is to be applied over the Cellophane 14. This strip is narrower than the strip 14 and has linearly spaced openings 24 slightly larger than the openings 15 in the strip 14 and which are so located that the two openings are disposed one over the other although the edge of the opening 15 is within the edge of the opening 24 as will be seen in Fig. 1, so as to prevent possible engagement of the edge of the strip 23 around the opening 24 with the adhesive exposed within the opening 15. Over each of the allergens 17, the material in strip 23 is preformed or pressed, as indicated at 25, to form a covering spaced from the allergen in order that the latter will not contact and adhere to the strip 23.

Heavier reinforcing strips 30 of Cellophane or similar cellulose derivative are cemented to opposite marginal portions of the strip 23 as indicated at 31 in Figs. 4 and 5. These strips, as shown, by Fig. 1, project beyond the ends of the strips 14 and 23 so that they may be gripped easily when it is desired to remove the strip 23 from covering relation to the strip 14. It may be added that the strips 14 and 23 may have legs 32 and 33, respectively, at their ends and the strips 30 are in alignment with these legs although disposed inwardly of their side edges. In all instances, the edges of the strip 23 are so related to the edges of the strip 14 that the strip

23 cannot contact with the adhesive on the adhesive tape, and it follows from this that the strip 23 may be easily removed from covering relation to the strip 14. The strips 30, in projecting beyond the ends of the strips 14 and 23, may have slight adherence to the adhesive over a very short linear portion and this may serve to hold the strip 23 in position prior to use. It may be added that the ends of the adhesive may have turned-over portions 34 covering the adhesive so as to provide non-adhesive grips advantageous in removing crinoline from the adhesive or removing the tape from the skin.

With the strip 23 in position over the strip 14, the entire adhesive side of the adhesive tape is then covered by crinoline 35, or, in other words, covered by conventional adhesive covering fabric. The crinoline adheres to the exposed adhesive along the margin of the strip 14 and in the exposed areas 15, and thus with the crinoline attached to the adhesive, the allergen containers formed between the two strips 14 and 23 are completely isolated one from another. Moreover, the crinoline holds the strips in good contact around the allergen receptacles formed between the two strips and thus prior to use each allergen is preserved in good condition due to the fact that Cellophane and like cellulose derivatives are impervious substantially to water and air. With the crinoline attached, the article is in condition for sale and may be applied at any time.

It should be understood that any number of allergen receptacles may be provided and that the size of the appliance may vary depending upon the number of allergens. An entire group of allergens, such as a group required for testing a patient's sensitivity in a hay fever condition, may be provided in a single appliance, and thus all of the allergens may be applied to a skin area at one time.

Assuming that the article is to be applied, the crinoline is pulled away from the adhesive tape and then the covering Cellophane 23 may be removed easily by means of the strips 30 so as to expose the different allergens. Then the appliance is placed on the skin of the patient and pressed thereagainst so as to cause the tape to adhere to the skin along its margins and in the areas 15. It follows that the allergens are applied to separated skin areas and the tape, in conjunction with the marginal portions of the Cellophane around each allergen, practically will be sealed against the skin area.

If "patch" testing is to be practiced, maceration of the skin may be allowed to occur due to sweating, as the Cellophane will prevent evaporation of moisture from the skin. In this case the reaction of the macerated skin to the allergen may be observed after sufficient time has elapsed. However, with the abrasive mixed with the allergen, the physician can quickly secure sufficient abrasion of the skin and contact of the allergen with the abraded skin by rubbing the exposed Cellophane so as to cause the abrasive and allergen to be rubbed against the skin. It will be apparent that the reaction of the different allergens may be observed through the Cellophane windows and that it is not necessary to remove the appliance until the test is completed. Any suitable indicia on the appliance may be employed for identification of the allergen.

In the form of the invention shown by Fig. 7, the adhesive tape 10 is similarly provided with the windows 12 and a strip of Cellophane 37 is applied next to the adhesive. Allergens are attached to the strip 37 over the windows 12, as previously described, but in this instance it will be noted that between the window 12, the Cellophane is continued and the adhesive is not exposed between the openings. A covering layer of Cellophane 40 to be applied over the Cellophane 37 first is cemented to the inner side of crinoline 35 and thus the two layers of Cellophane are respectively attached to the adhesive tape and to the crinoline prior to bringing them into assembled relation. Then the Cellophane 37 and crinoline are outwardly pressed or preformed in regions over the allergens so as to form receptacles which allow separation of the covering Cellophane and the allergens. When the crinoline with the Cellophane attached is applied to the tape and first layer of Cellophane, it adheres to the tape along the margins and the two layers of Cellophane contact around each receptacle, so that the allergens are maintained completely separated and in air and watertight receptacles which preserve the condition of such allergens. When it is necessary to use this appliance, the crinoline is removed from the adhesive tape 10 and removal of this also removes the covering Cellophane 40 due to the adhesion between the latter and the crinoline. The adhesive 10 with the Cellophane 37 thereon may then be applied to the skin area and the allergens again will be exposed through transparent windows so that reactions may be observed. It may be mentioned that application of the adhesive against the skin will be sufficiently flat to hold the Cellophane around the allergen in contact with the skin and thus each allergen will be maintained in a sealed recess, so to speak, formed by the skin and the covering Cellophane. Abrasion of the skin surface may be obtained in the same way as previously described due to the abrasive present in the allergen material, or maceration of the skin may be awaited without first causing abrasion.

The construction shown by Fig. 8 is substantially like that shown in Fig. 7 excepting that a slit 42 is formed in the Cellophane 37 along the location of each of the allergens and this slit may be sealed by any suitable sealing material or the gummy substance mixed with the allergen may be pressed over the slit so as to effect sealing thereof. It will be realized that only a portion of this gummy substance need be used to seal the slit and therefore that the allergen on the operative side of the Cellophane still may be preserved in good condition. This appliance may be used in the same way as that shown by Fig. 7, or an instrument may be pushed through the slit 42 for the purpose of securing abrasion by manipulation of the instrument. For that matter, it may be stated that abrasion by means of an instrument may be secured in connection with the other embodiments of the invention, by forming a slit in the exposed Cellophane after the tape is applied to the skin, but it seems preferable to either secure the abrasion by means of the abrasive substance mixed with the allergen through rubbing it against the skin, or by first forming a slit 42 that readily permits penetration of an instrument suitable for the purpose.

Fig. 9 shows the reverse side of the construction illustrated in Fig. 8 and in this view it will be readily understood how the allergens and skin reactions may be observed from time to time without removing the appliance.

Fig. 11 shows an instrument that may be used for securing manual abrasion of the skin surface through the slit 42. This instrument is in the

form of a dropper 50 having an end 51 on the order of a Von Pirquet scarifier. An enlargement 52 at the center of the tube may be gripped and turned back and forth in order to secure turning of the end 51 and abrasion of the skin. A bulb 53 on the other end of the tube 50 enables drawing a weak soda solution into the tube and discharging a small quantity thereof in the region of the allergen in the event the physician desires to use such solution at the time the abrasion is effected. It will be observed that the bulb 53 is offset from the main body portion of the tube so as to provide for better hand manipulation of the instrument. In using this instrument, the projection 51 may be pushed through the slit 42 and then the instrument may be pressed against the skin and be turned back and forth within limits to cause abrasion of the latter.

Fig. 13 shows an identifying chart comprising a Celluloid strip or sheet 59 having windows substantially corresponding in shape to the windows 12 in the tape. At the right of the windows, printed or drawn colored illustrations 61, 62, 63, 64, and 65 are provided denoting respectively different degrees of positive reactions, and also a negative reaction. The investigator can selectively place the openings 60 over any opening 12 in the tape until the reaction on the skin, if any, corresponds to one of the illustrated positive reactions on the chart and then the character of the reaction may be recorded, that is, the degree of positive reaction or that it is negative, if there is no positive reaction. The reaction to all of the allergens may be observed and compared in this way.

In any of the forms of the invention as described and illustrated, it will be appreciated that a single appliance may be attached to the skin and that this appliance may contain an entire group of allergens pertinent to any particular physical condition. Thus, the appliance may contain an entire group of allergens pertinent to hay fever, or it may contain an entire group of allergens pertinent to determining food reactions. The appliance may be easily employed and abrasion of the skin may be easily effected by means of the abrasive material mixed with the allergen, or by using an instrument for this purpose as mentioned. Again the allergens may be allowed to act through maceration of the skin due to use of an impervious cellulose derivative which substantially prevents moisture from evaporating from the skin and prevents air from reaching the skin. In any case, it is a simple procedure to apply the article to the skin and it is not necessary to remove it until the tests are completed, since the skin reactions to the allergens may be observed through the transparent windows. Thus, rapidity of application without tedious effort may be effected. Furthermore, observations may be made without great effort on the part of the physician and certainly without tedious and time consuming efforts that are irritating to both physicians and patients alike. From the patient's point of view, the appliance does not cause undesirable discomfort and even where abrasions are manually effected through the Cellophane windows, any possible discomfort is reduced to a minimum.

Although more than one form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made without departing from the scope of the appended claims.

What is claimed is:

1. A medical appliance comprising a thin layer of substantially impervious to air and water material, a second layer of material forming a cover for the first layer, a medicinal preparation between the two layers, means releasably holding the layers together so as to form a closed receptacle for preserving the preparation, and adhesive attached to the first layer so that upon removal of the second layer, the first layer and medicinal preparation may be applied to a skin surface and held thereto by the adhesive.

2. A medical appliance comprising a thin layer of transparent material substantially impervious to air and moisture, a second similarly impervious layer of material forming a cover for the first layer, a medicinal preparation between the two layers, means releasably holding the two layers together so as to form a closed receptacle for preserving the preparation, and adhesive attached to the transparent layer so that upon removal of the cover, the transparent layer and preparation may be applied to a skin surface and be held thereon by the adhesive, said adhesive and transparent layer being so arranged that the skin surface is visible through such layer.

3. A medical appliance comprising a thin layer of a cellulose derivative impervious to water and air, a second similarly impervious layer of material forming a cover for the first layer, a medicinal preparation between the two layers, means releasably holding the two layers together so as to form a closed receptacle for preserving the preparation, and an adhesive tape over the back of the first layer and having its marginal portions projecting beyond the margin of the first layer so that the edges of the latter may be held against the skin by the adhesive, said first layer being transparent and the tape having an opening through which the reaction of the skin to the preparation may be observed through said layer.

4. A medical appliance for making allergenic tests, comprising a strip of material substantially impervious to air and moisture, allergens differing in kind disposed respectively in spaced relation on one side of said strip, cover means of similarly impervious character releasably disposed over the allergens so that each allergen is located between the cover and strip, and adhesive means on the strip for fastening it to a skin surface after the cover means is removed, whereby a group of different allergens may be simultaneously applied to a skin surface and be held in separated locations thereon.

5. A medical appliance to be applied to the skin, comprising a backing strip, an allergenic material disposed on the strip and which comprises an allergen and an abrasive substance whereby the skin in the region of the allergen may be abraded for allergenic reaction by manual rubbing pressure applied to the material, and means for fastening the backing strip to the skin.

6. A medical appliance comprising a thin layer of material substantially impervious to air and water, a second layer of material forming a cover for the first layer, a medicinal preparation between the two layers and attached to the first layer, and adhesive means on the first lever for fastening it to the skin after the second layer is removed so that the preparation will be held against the skin surface.

7. An allergenic appliance to be applied to the skin comprising a backing layer having allergenic material on one side and also having an

abrasive substance in the region of the allergenic material whereby the skin in the region of the material may be abraded for allergenic reaction by manual rubbing pressure applied to the layer after the latter is applied against the skin surface.

8. An allergenic appliance to be applied to the skin comprising a layer of flexible, transparent material, an allergenic material disposed on the layer, and an abrasive substance on the layer in the region of the allergenic material whereby the skin in the region of the allergenic material may be abraded for allergenic reaction by manual rubbing pressure applied to the layer after it is applied to the skin.

STANLEY V. LAUB.

CERTIFICATE OF CORRECTION.

Patent No. 2,235,436. March 18, 1941.

STANLEY V. LAUB.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 69, claim 6, for the word "lever" read --layer--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of April, A. D. 1941.

Henry Van Arsdale,

(Seal) Acting Commissioner of Patents.